



**Rate Setting Guidelines**  
**for**  
**Electricity Distribution and Supply**

**VOLUME 2**  
**METHODOLOGY**

**REVISION 1.5**



## **CONTENT AND STRUCTURE OF DOCUMENT**

This document issued by the Public Utilities Regulatory Commission (PURC) constitutes the approved Rate Setting Guidelines for Major Reviews of electricity distribution and supply tariffs in Ghana. The document is organized as follows:

- Volume 1 – The main volume which is required as part of all other Volumes describes the Tariff Philosophy and Tariff Approval process, including the legal basis and minimum filing requirements underlying the rate setting guidelines for Electricity Distribution and Supply.
- Volume 2 - This Volume which is complementary to Volume 1 sets out the methodology including the formulae and principles for the determination of revenue requirements for Electricity Distribution and Supply by PURC.

This volume is structured as below:

PART 1 - Definitions and Equation Parameters

PART 2- Methodology for determination of Annual Revenue Requirements for Electricity Distribution

PART 3- Methodology for determination of Annual Revenue Requirements for Electricity Supply

PART 4 – Cost Allocation and Tariff Design

PART 5- Appendix

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**DEFINITIONS**

<b>Term</b>	<b>Definition</b>
<b>Customer-Related Cost</b>	Means all costs relating to customers which includes cost of metering, cost of billing, account processing and handling of customer complaints.
<b>Demand-Related or Capacity-Related Cost</b>	Means all fixed costs relating to kW of peak demand which includes return, annual depreciation expense, operations and maintenance relating to generation capacity, transmission lines, distribution lines and transformers.
<b>Electricity Distribution Utility</b>	Means a Company licensed to own and/or operate an electricity distribution network assets as well as engage in supply/retail sale
<b>Energy-Related Cost</b>	Means a variable cost relating to kWh of energy generated including fuel and non-fuel variable operating cost.
<b>Legacy Distribution Network Assets</b>	Means distribution assets which were not funded directly by the Distribution Utility but by Shareholders.
<b>Major Tariff Review</b>	Means a comprehensive evaluation and potential adjustment of the pricing structure and rates associated with the supply and consumption of electrical energy.
<b>New Distribution Network Investments</b>	Means allocation of financial resource by the Distribution Utility towards the development, expansion, or improvement of the infrastructure that facilitates the distribution of electrical energy to end-users.
<b>Regulatory Control Period</b>	Means a period, in a designated number of years, for which the approved tariffs shall apply.
<b>Retail Sale/Supply</b>	Means all activities relating to Meter Reading, Billing and Customer Management.
<b>Test Year</b>	Means first year of PURC's Multi-Year Major Tariff Review Regulatory Control Period
<b>Total Revenue Requirement</b>	Means total cost of electricity supply including total generation cost, transmission cost, distribution and supply costs.

**EQUATION PARAMETERS**

<b>Capital Expenses (Distribution)</b>	As calculated pursuant to Section 1.7.4
<b>Capital Expenses (Supply)</b>	As calculated pursuant to Section 2.7
<b>Corporate Tax (Distribution)</b>	As calculated pursuant to Section 1.11
<b>Corporate Tax (Supply)</b>	As calculated pursuant to Section 2.12
<b>Correction Factor (Distribution)</b>	As calculated pursuant to Section 1.12.1
<b>Correction Factor (Supply)</b>	As calculated pursuant to Section 2.13.1
<b>Cost of Debt</b>	As calculated pursuant to Section 1.5.2
<b>Cost of Equity</b>	As calculated pursuant to Section 1.5.1
<b>Cost of Working Capital Allowance (Distribution)</b>	As calculated pursuant to section 1.10
<b>Cost of Working Capital Allowance (Supply)</b>	As calculated pursuant to section 2.11
<b>Depreciation (Supply)</b>	As calculated pursuant to Section 2.5
<b>Depreciation on Regulated Asset Base (Distribution)</b>	As calculated pursuant to Sections 1.6
<b>Depreciation on Regulated Asset Base (Supply)</b>	As calculated pursuant to Sections 2.5
<b>Disposition Proceeds (Distribution)</b>	As calculated pursuant to Section 1.7.5
<b>Disposition Proceeds (Supply)</b>	As calculated pursuant to Section 2.8
<b>Mid-Year Regulated Asset Base (Distribution)</b>	As calculated pursuant to Section 1.7.3
<b>Mid-Year Regulated Asset Base (Supply)</b>	As calculated pursuant to Section 2.6.3
<b>Initial Opening Regulated Asset Base (Distribution)</b>	As calculated pursuant to Section 1.7.1
<b>Initial Opening Regulated Asset Base (Supply)</b>	As calculated pursuant to Section 2.6.1
<b>Opening Regulated Asset Base (Distribution)</b>	As calculated pursuant to Section 1.7.2
<b>Opening Regulated Asset Base (Supply)</b>	As calculated pursuant to Section 2.6.2
<b>Operating Expenses (Distribution)</b>	As calculated pursuant to Sections 1.2
<b>Operating Expenses (Supply)</b>	As calculated pursuant to Sections 2.2
<b>Return on Regulated Asset Base (Distribution)</b>	As calculated pursuant to Sections 1.3
<b>Return on Regulated Asset Base (Supply)</b>	As calculated pursuant to Sections 2.3
<b>Target Aggregate Technical and Commercial Loss Ratio</b>	As calculated pursuant to Section 2.19
<b>Target Collection Loss Ratio</b>	As calculated pursuant to Section 2.20
<b>Weighted Average Cost of Capital</b>	As calculated pursuant to Section 1.5
<b>Working Capital Allowance (Distribution)</b>	As calculated pursuant to Section 1.9
<b>Working Capital Allowance (Supply)</b>	As calculated pursuant to Section 2.10

### INTERPRETATION

This Volume shall be interpreted in accordance with Volume 1; and capitalized terms used but not defined shall have the meanings assigned in Volume 1.

1. Capitalised terms shall have the meanings assigned in the Definitions;
2. Capitalised terms used but not defined shall have the meanings assigned in the Act where the context demands;
3. References to the singular include the plural and vice versa where the context demands;
4. References to a statute include a reference to any regulations or orders made under or pursuant to it;
5. Where a value is expressed in nominal terms, it is expressed in terms of prices in the year in which the amount is or will be expensed, received, realised, or incurred; and
6. Where a value is expressed in real terms, it is expressed in terms of prices at a particular and constant point in time (such as the average of prices in a reference year or at a particular point in time during a reference year)

Revenue Requirements approved as per this methodology are meant to be approved in each Major Tariff Review in real terms (currency of the Base Year) for the review period, and to set tariff rates for the Base Year of the period. For subsequent years in the Tariff Regulatory Period until the next Major Review, annual revenues shall be corrected as per Sections **Error! Reference source not found.** and **Error! Reference source not found.**, and tariffs shall be updated as per the PURC Guidelines on quarterly reviews (minor reviews).

Therefore, for the purpose of Annual Revenue Requirements computation and revenue correction in the following sections, all monetary amounts are computed in real Ghana Cedis of the base year.

**PART 1: ANNUAL REVENUE REQUIREMENT- ELECTRICITY DISTRIBUTION**

**1.1 Calculation of Annual Revenue Requirement (Distribution)**

The Annual Revenue Requirement for Distribution Network operations shall be estimated as of each Major Tariff review determination date in accordance with the following formula:

$$ARR(Dis)_t = OpEx(LegDisNAs)_t + OpEx(NewDisNIs)_t + [RnLegRAB(DisNAs)_t + DepLegRAB(DisNAs)_t] + CRP(NewDisNIs)_t + CWCA(DisNAs)_t + CorpTax(Dis)_t + K(Dis)_t$$

Where:

ARR(Dis) <sub>t</sub>	means Annual Revenue Requirement in respect of Distribution Network Operations commencing Regulatory Year ‘t’
OpEx(LegDisNAs) <sub>t</sub>	means Operating Expenses in respect of Legacy Distribution Network Assets commencing Regulatory Year ‘t’ calculated in accordance with Section 1.2.1
OpEx(NewDisNIs) <sub>t</sub>	means Operating Expenses in respect of New Distribution Network Investments commencing Regulatory Year ‘t’ calculated in accordance with Section 1.2.2
RnRAB(LegDisNAs) <sub>t</sub>	means Return on Legacy Distribution Network Regulated Asset Base commencing Regulatory Year ‘t’ calculated in accordance with Section 1.3.1
DepRAB(LegDisNAs) <sub>t</sub>	means Depreciation on Legacy Distribution Network Regulated Asset Base commencing Regulatory Year ‘t’ calculated in accordance with Section 1.6
CRP(NewDisNIs) <sub>t</sub>	means Capital Recovery Payments in respect of New Investments made by Electricity Distribution Utility commencing Regulatory Year ‘t’ calculated in accordance with Section 1.8
CWCA(DisNAs) <sub>t</sub>	means Cost of Working Capital Allowance in respect of Distribution Network Assets commencing Regulatory Year ‘t’ calculated in accordance with Section 1.9.1
CorpTax (Dis) <sub>t</sub>	means Corporate Taxes in respect of Distribution Network operations commencing Regulatory Year ‘t’ calculated in accordance with Section 1.10
K(Dis) <sub>t</sub>	means Correction Factor in respect of Distribution Network operations calculated in respect of Regulatory Year ‘t’ in accordance with Section 1.11.1

**1.2 Operating Expenses**

Operating expenses shall be determined for both Legacy Distribution Network Assets (LegDisNAs) and New Distribution Network Investments (NewDisNIs) for the first regulatory year and subsequent regulatory years in a Regulatory Control Period. The Commission shall disaggregate human resource expenses, operation and maintenance expenses, customer service expenses, and administration and general expenses, and ringfence human resource expenses as standalone expenses.

**1.2.1 Legacy Distribution Network Assets - First Regulatory Year**

Operating expenses relating to Legacy Distribution Network Assets shall be determined with respect to the first regulatory year in a Regulatory Control Period as follows.

**1.2.1.1 Human Resource Expense**

For determination of human resource expense for first regulatory year in Regulatory Control Period, the Commission shall ring-fence these expenses in consultation with the Electricity Distribution Utility. Where human resource expense is projected, the projections shall be supported by relevant documentation.

**1.2.1.2 Other Operating Expense**

For determination of other operating expenses categorised into operation and maintenance expense, administrative and general expense for the first regulatory year in a Regulatory Control Period, the following methodology shall be applied.

$$\text{OpEx}_t = \text{PAEDNAV} * \gamma$$

Where:

OpEx <sub>t</sub>	means First Regulatory Year Operating Expenses defined as Test Year of the Regulatory Control Period
PAEDNAV	means PURC Approved Test Year Electricity Distribution Network Asset Value
γ	means PURC Approved Operating Expense Efficiency Benchmark Percentage

**1.2.2 Legacy Distribution Network Assets - Subsequent Regulatory Years**

Operating expenses relating to Legacy Distribution Network Assets shall be determined with respect to subsequent regulatory years in a Regulatory Control Period as follows.

**1.2.2.1 Human Resource Expense**

For subsequent regulatory years in a Regulatory Control Period, the Commission shall approve human resource expense in consultation with the Electricity Distribution Utility taking into consideration all relevant documentation approved by the Board of the Electricity Distribution Utility.

**1.2.2.2 Other Operating Expense**

For subsequent regulatory years, the Commission shall determine other operating expenses using the following formula.

$$\text{OpEx}(\text{LegDisNAs})_{t+1} = \text{OpEx}(\text{LegDisNAs})_t + (\text{VNCLegDisNAs} * \mu)$$

Where:

OpEx(LegDisNAs) <sub>t+1</sub>	means Forecast Operating Expenses of Electricity Distribution Utility in respect of Legacy Distribution Network Assets
OpEx(LegDisNAs) <sub>t</sub>	means Base Year Operating Expenses of Electricity Distribution Utility in respect of Legacy Distribution Network Assets
VNCLegDisNAs	means Value of Newly Commissioned Legacy Distribution Network Assets
μ	means Percentage of Value of Newly Commissioned Legacy Assets Dedicated to Operating Expenses Approved by the Commission

**1.2.3 New Distribution Network Investments - First Regulatory Year**

Operating Expenses such as human resource expense, operation and maintenance expense, customer services expense, administration and general expense relating to Newly Commissioned Distribution Network Investments shall be determined with respect to first regulatory year in a Regulatory Control Period as follows.

**1.2.3.1 Human Resource Expense**

PURC shall assess and approve human resource expense dedicated to operating Newly Commissioned Distribution Network Investments for first regulatory year in a Regulatory Control Period in consultation with the Electricity Distribution Utility taking into consideration all relevant documentation approved by the Board of the Electricity Distribution Utility.

**1.2.3.2 Other Operating Expense**

Other Operating Expense as categorised (excluding human resource expense) for first regulatory year in a Regulatory Control Period in respect of New Distribution Network Investments undertaken by Electricity Distribution Utility, shall be determined by the PURC using the following formula.

$$\text{OpEx}(\text{NewDisNIs})_t = \text{VNCDisNIs} * \mu$$

Where:

$\text{OpEx}(\text{NewDisNIs})_t$  means Base Year Operation and Maintenance Expenses in respect of New Distribution Network Investments undertaken by Electricity Distribution Utility

$\text{VNCDisNIs}$  means Value of Newly Commissioned Distribution Network Investments undertaken by Electricity Distribution Utility

$\mu$  means Percentage of Value of Newly Commissioned Distribution Network Investments dedicated to Operating Expenses as approved by the Commission

**1.2.4 New Distribution Network Investments - Subsequent Regulatory Years**

Operating expenses relating to New Distribution Network Investments shall be determined with respect to subsequent regulatory years in a Regulatory Control Period as follows.

**1.2.4.1 Human Resource Expense**

The Commission shall assess and approve human resource expense dedicated to operating newly commissioned Distribution Network Investments for subsequent regulatory years in consultation with the Electricity Distribution Utility taking into consideration all relevant documentation approved by the Board of the Electricity Distribution Utility.

**1.2.4.2 Other Operating Expense**

For subsequent regulatory years in a Regulatory Control Period, PURC shall determine other operating expenses of an Electricity Distribution Utility using the following formula.

$$\text{OpEx}(\text{NewDisNIs})_{t+1} = \text{OpEx}(\text{NewDisNIs})_t + (\text{VNCDisNIs} * \mu)$$

Where:

$\text{OpEx}(\text{NewDisNIs})_{t+1}$  means Forecast Operation and Maintenance Expenses in respect of New Distribution Network Investments of Electricity Distribution Utility

$\text{OpEx}(\text{NewDisNIs})_t$  means Base Year Operation and Maintenance Expenses in respect of New Distribution Network Investments of Electricity Distribution Utility

$\text{VNCDisNIs}$  means Value of Newly Commissioned Distribution Network Investments

$\mu$  means Percentage of Value of Newly Commissioned Distribution Network Investments/Assets Dedicated to Operating Expenses as Approved by the Commission

### 1.3 Return on Distribution Network Regulatory Asset Base

#### 1.3.1 Legacy Network Regulatory Asset Base

The return on legacy Distribution Network Regulatory Asset Base, commencing Regulatory Year (Regulatory Year ‘t’) shall be calculated as follows:

$$RnRAB(LegDisNAs)_t = MidYearRAB(LegDisNAs)_t * WACC$$

Where:

$RnRAB(LegDisNAs)_t$  means the Return on Legacy Regulated Asset Base for Regulatory Year ‘t’

$MidYearRAB(LegDisNAs)_t$  means the Mid-Year Legacy Regulated Asset Base for Regulatory Year ‘t’ calculated pursuant to Section 1.6.3

WACC means the Weighted Average Cost of Capital calculated pursuant to Section 1.5

#### 1.3.2 New Distribution Network Investments

The return on new distribution network investments commencing Regulatory Year ‘t’ shall be calculated as follows:

$$Rn(NewDisNIs)_t = MidYear(NewDisNIs)_t * WACC$$

Where:

$Rn(NewDisNIs)_t$  means Return on New Distribution Network Investments for Regulatory Year ‘t’

$MidYear(NewDisNIs)_t$  means the Mid-Year New Distribution Investments for Regulatory Year ‘t’ calculated pursuant to Section 1.6.3

WACC means the Weighted Average Cost of Capital calculated pursuant to Section 1.5

### 1.4 Gearing

In calculating the allowable Rate of Return on Regulatory Asset Base (RAB) for both Legacy Assets and New Distribution Network Investments, the Commission shall apply its benchmark gearing level of 30% equity and 70% debt.

### 1.5 Allowable Rate of Return on Regulated Asset

The allowable rate of return shall be set equal to the estimated Weighted Average Cost of Capital (WACC). The PURC shall determine the post-tax WACC by taking into consideration, cost of debt and cost of equity as well as the Commission’s benchmark debt and equity ratios using the following formula.

$$WACC = \left[ \frac{E}{D+E} * R_e \right] + \left[ \frac{D}{D+E} * R_d * (1-T) \right]$$

Where:

WACC means Post-tax WACC

E means Equity

D means Debt

Re means Cost of Equity

Rd means Pre-tax Cost of Debt

T means Corporate Tax Rate

### 1.6 Depreciation on Distribution Network Regulatory Asset Base

Depreciation shall be calculated in respect of both Legacy Distribution Network Regulatory Asset Base and Newly Commissioned Distribution Network Investments using the straight-line method of depreciation/amortisation. The depreciation on assets and investments in respect of a Regulatory Year ‘t’

shall equal depreciation, which the Electricity Distribution Utility will recognise and approved by PURC during Regulatory Year ‘t’ with respect to the Opening Legacy Distribution Network Assets as well as Newly Commissioned Distribution Network Investments.

**1.7 Regulated Asset Base**

The Regulatory Asset Base which comprises Legacy Distribution Network Regulatory Asset Base and Newly Commissioned Investments of the Electricity Distribution Utility, shall at any particular point in time be revalued at its replacement cost.

**1.7.1 Opening Regulatory Asset Base - First Regulatory Year**

The Initial Opening Regulatory Asset Base, commencing Regulatory Year ‘1’ of the First Regulatory Control Period, shall be the Legacy Distribution Network Regulatory Asset Base and Newly Commissioned Investments by the Electricity Distribution Utility (where applicable) determined by the Commission as follows.

$$\text{OpeningRAB(Dis)}_t = \text{OpeningRAB(Dis)}_{t-1} + \text{ActCapEx(Dis)}_{t-1} - \text{ActDep(Dis)}_{t-1} - \text{ActDisp(Dis)}_{t-1}$$

Where:

- Opening RAB(Dis)<sub>t</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t’
- Opening RAB(Dis)<sub>t-1</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t-1’
- ActCapEx(Dis)<sub>t-1</sub> means the actual Capital Expenses for Regulatory Year ‘t-1’, subject to a prudence test by PURC if actual Capital Expenses exceeds the approved Capital Expenses for such Regulatory Year, calculated in accordance with Section 1.7.4
- ActDep(Dis)<sub>t-1</sub> means the actual Depreciation for Regulatory Year ‘t-1’, calculated in accordance with Section 1.6
- ActDisp(Dis)<sub>t-1</sub> means the actual Disposition Proceeds for Regulatory Year ‘t-1’, calculated in accordance with Section 1.7.5

**1.7.2 Opening Regulatory Asset Base - Subsequent Regulatory Year**

The Electricity Distribution Utility shall provide detailed information for calculation and filing of Legacy Distribution Network Regulatory Asset Base and Newly Commissioned Investments by the Electricity Distribution Utility (where applicable) for the subsequent regulatory year other than the first regulatory year for determination and approval by PURC.

The roll-forward for the Regulatory Asset Base shall be subject to a prudence test by PURC. The following formula shall be used to roll-forward the Regulatory Asset Base from the opening value for the first year of the previous Regulatory Period.

$$\text{OpeningRAB(Dis)}_{t+1} = \text{OpeningRAB(Dis)}_t + \text{CapEx(Dis)}_t - \text{Dep(Dis)}_t - \text{Disp(Dis)}_t$$

Where:

- OpeningRAB(Dis)<sub>t+1</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t+1’
- OpeningRAB(Dis)<sub>t</sub> means the Opening Regulated Asset Base for First Regulatory Year ‘t’
- CapEx(Dis)<sub>t</sub> means the approved Capital Expenses for First Regulatory Year ‘t’, calculated in accordance with Section 1.7.4
- Dep(Dis)<sub>t</sub> means the Depreciation for First Regulatory Year ‘t’, calculated in accordance with Section 1.6

Disp(Dis)<sub>t</sub> means the Disposition Proceeds for First Regulatory Year ‘t’, calculated in accordance with Section 1.7.5.

### **1.7.3 Mid-Year Regulated Asset Base**

The Mid-Year Regulated Asset Base as of the mid-point of each Regulatory Year shall be calculated as follows:

$$\text{MidYearRAB(Dis)}_t = \text{OpeningRAB(Dis)}_t + 0.5(\text{CapEx(Dis)}_t - \text{Dep(Dis)}_t - \text{Disp(Dis)}_t)$$

Where:

MidYearRAB(Dis)<sub>t</sub> means the Mid-Year Regulated Asset Base for Regulatory Year ‘t’

OpeningRAB(Dis)<sub>t</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t’

CapEx(Dis)<sub>t</sub> means the Capital Expenses for Regulatory Year ‘t’, calculated in accordance with Section 1.7.4

Dep(Dis)<sub>t</sub> means the Depreciation for Regulatory Year ‘t’, calculated in accordance with Section 1.6

Disp(Dis)<sub>t</sub> means the Disposition Proceeds for Regulatory Year ‘t’, calculated in accordance with Section 1.7.5

### **1.7.4 Capital Expenses**

Capital Expenses for each Regulatory Year occurring during first and subsequent regulatory years in a Regulatory Control Period shall equal the amount approved by PURC pursuant to the relevant Major Tariff Review Decision. Capital Expenses in respect of a project shall be recognized at the time of commissioning and shall include capitalized interest.

### **1.7.5 Disposition Proceeds**

Disposition Proceeds for each Regulatory Year (Regulatory Year ‘t’) shall equal the proceeds realized by the Electricity Distribution Utility from the sale of any assets that are no longer useful in connection with the provisions of Distribution Service.

### **1.8 Capital Recovery Payments on New Distribution Network Investments**

Capital Recovery Payments in respect of New Distribution Network Investments made by the Electricity Distribution Utility commencing Regulatory Year ‘t’ shall be the sum of Return and Depreciation on Newly Commissioned Distribution Network Investments calculated in accordance with Section 1.3.2 and Section 1.6.

### **1.9 Working Capital Allowance**

The Working Capital Allowance commencing Regulatory Year (Regulatory Year ‘t’) shall be calculated as follows:

$$\text{WCA(DisNAs)}_t = \frac{\text{Lag(Days)}_t - \text{Lead(Days)}_t + \text{Inventory (Days)}}{365} * \text{OpEx(DisNAs)}_t$$

Where:

WCA(DisNAs)<sub>t</sub> means Working Capital Allowance in respect of Distribution Network Assets calculated for Regulatory Year ‘t’

Lag Days means Average Debtor Days calculated for Regulatory Year ‘t’

Lead Days means Average Creditor Days Calculated for regulatory Year ‘t’

$OpEx(DisNAs)_t$  means Sum of Operating Expenses in respect of Distribution Network Assets calculated for Regulatory Year 't'

### **1.9.1 Cost of Working Capital Allowance**

The Cost of Working Capital Allowance Distribution Network Assets commencing Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$CWCA(DisNAs)_t = WCA(DisNAs)_t * WACC$$

Where:

$CWCA(DisNAs)_t$  means Cost of Working Capital Allowance in respect of Distribution Network Assets calculated for Regulatory Year 't'

$WCA(DisNAs)_t$  means Working Capital Allowance in respect of Distribution Network Assets calculated for Regulatory Year 't'

WACC means Weighted Average Cost of Capital calculated pursuant to Section 1.5

PURC shall ensure that the Electricity Distribution Utility observes optimal working capital allowance management practices in accordance with international standards.

Prior to or upon commencement of the Regulatory Control Period, a lead – lag study shall be undertaken to form the basis for the determination of the regulatory working capital allowance.

### **1.10 Corporate Tax**

Corporate Tax on the distribution licence business shall be in accordance with the provisions of Applicable Ghana Revenue Tax Laws. The Corporate tax shall be treated as an expense hence incorporated into Annual Revenue Requirement and recovered from consumers through tariff. The corporate tax shall be computed using the following formula.

$$CorpTax_t = (Pre-Tax WACC - Post-Tax WACC) * RAB_{EDU}$$

Where:

$CorpTax_t$  means Corporate Tax

Pre-Tax WACC means Weighted Average Cost of Capital Including Corporate Tax Percentage

Post-Tax WACC means Weighted Average Cost of Capital Excluding Corporate Tax Percentage

$RAB_{EDU}$  means PURC Approved Test Year Regulatory Asset Base of Electricity Distribution Utility

### **1.11 Correction of Electricity Distribution Revenue**

The correction factor shall be a monetary value whereby maximum allowed revenue for Regulatory Year 't' is decreased or increased by the difference between Approved Annual Revenue Requirement and the efficient and prudent revenue requirement (actual) for the relevant regulatory years calculated in accordance with the methodology below.

PURC shall correct for over-recovery or under-recovery of Electricity Distribution revenue using the correction factor established on the basis of actual electricity distributed, and actual billing data (billed energy and number of customers) assuming PURC Target Aggregate Technical, Commercial and Collection Losses as established in Sections 2.17 and 2.18. Correction Factors shall be calculated using Annual and Quarterly Reports as well as other relevant data submitted to PURC by the Electricity Distribution Utility.

### 1.11.1 Correction Factor

The Correction Factor in respect of Regulatory Year ‘t’ shall equal zero (0) for the purposes of estimating the Annual Revenue Requirement (Distribution) for Regulatory Year ‘1’ and Regulatory Year ‘2’ of Regulatory Control Period, and shall be calculated as follows thereafter:

$$K(\text{Dis})_t = \left[ (\text{AdjARR}(\text{Dis})_{t-2} - \text{ActualTRev}(\text{Dis})_{t-2}) \right] * [(1 + \text{WACC})^2]$$

Where:

$K(\text{Dis})_t$  means the Correction Factor calculated for Regulatory Year ‘t’

$\text{AdjARR}(\text{Dis})_{t-2}$  means the Adjusted Annual Revenue Requirement (Distribution) for Regulatory Year ‘t-2’ as per actual market conditions

$\text{ActualTRev}(\text{Dis})_{t-2}$  means the revenues Electricity Distribution Utility would have earned and collected during Regulatory Year ‘t-2’ by charging Distribution Service Rates, calculated assuming that Electricity Distribution Utility achieved the Target Aggregate Technical and Commercial Loss Ratio and Target Collection Loss Ratio that were applicable to Regulatory Year ‘t-2’ given the actual energy metered at the bulk supply points

WACC means the Weighted Average Cost of Capital calculated pursuant to Section 1.5

### 1.12 Casualties to the Distribution System

An Electricity Distribution Utility shall procure and maintain, in its name, property and casualty insurance over the Distribution System.

Upon the occurrence of a casualty to an asset that constitutes part of the Regulated Asset Base, the Electricity Distribution Utility shall use the proceeds of any insurance claim in respect of the casualty to repair or replace the asset, unless repair or replacement of the asset is not necessary for the continued provision of service in accordance with the terms of the Distribution Licence and the Supply Licence.

In the event that insurance proceeds are not sufficient to repair or replace the asset, the Utility shall fund the repair or replacement as it would fund any other capital expense.

The portion of the value of an asset that is (i) recovered from the proceeds of any insurance claim, and (ii) used by the utility to repair or replace the asset shall remain in the Regulated Asset Base. An amount equal to the portion of any insurance proceeds not used by the utility to repair or replace the asset as a result of the circumstances contemplated, shall be removed from the Opening Regulated Asset Base.

The portion of the value of such asset that is not recovered from the proceeds of any insurance claim shall be:

- added to Operating Expenses for the regulatory year during which the casualty occurred; and
- removed from the Opening Regulated Asset Base

provided, that, if such an amount would cause a material increase in the Annual Revenue Requirement (Distribution), then PURC may, in its discretion, decide that the amount shall remain in the Opening Regulated Asset Base and shall be depreciated over a period that PURC may determine.

The costs incurred by Electricity Distribution Utility to repair or replace the asset minus the amount of any insurance proceeds shall be added to Capital Expenses for the Regulatory Year during which the Casualty occurred.

**1.13 Approval of Revenue Requirement**

The Commission is not obliged to approve the amount for each cost element or sub-element of the revenue requirement proposed by the Electricity Distribution Utility. The Commission may allow or disallow the proposed revenue requirement based on a thorough evaluation of the proposed amount. The revenue requirement shall be allowed if it is found to be reasonable, prudent, and necessary to provide safe, reliable, and affordable service to customers. The revenue requirement may be reduced or portions disallowed based on the impact on the Utilities, customers and the economy while ensuring financial sustainability of the Utilities.

**PART 2: ANNUAL REVENUE REQUIREMENT - ELECTRICITY SUPPLY**

As specified in Energy Commission Act, 1997 (Act 541), Section 26 and Electricity Retail Sale License, rates and tariffs to be charged by a Licensee for electricity retail sale services in the regulated electricity market or tariffs chargeable for electricity retail sale by a person licensed to undertake bulk procurement of electricity from a wholesale supplier and sell to retail consumers without discrimination in a designated area or zone shall be subject to approval by the PURC using following methodology.

**2.1 Calculation of Annual Revenue Requirement (Supply)**

The Annual Revenue Requirement in respect of Retail Sale/Supply shall be estimated as of each Major Tariff Review Determination Date in accordance with the following formula:

$$ARR(\text{Supp})_t = \text{OpEx}(\text{LegSuppAs})_t + \text{OpEx}(\text{NewSuppAs})_t + [\text{RnLegRAB}(\text{SuppAs})_t + \text{DepLegRAB}(\text{SuppAs})_t] + \text{CRP}(\text{NewSuppAs})_t + \text{CWCA}(\text{Supp})_t + \text{CorpTax}(\text{Supp})_t + \text{K}(\text{Supp})_t$$

Where:

$ARR(\text{Supp})_t$	means Annual Revenue Requirement in respect of Retail Sale/Supply Operations commencing Regulatory Year ‘t’
$\text{OpEx}(\text{LegSAs})_t$	means Operating Expenses in respect of Retail Sale/Supply Assets for Regulatory Year ‘t’ calculated in accordance with Section 2.2.1
$\text{OpEx}(\text{NewSuppAs})_t$	means Operating Expenses in respect of New Supply Assets calculated in accordance with Section 2.3
$\text{RnLegRAB}(\text{SuppAs})_t$	means Return on Legacy Supply Regulated Asset Base commencing Regulatory Year ‘t’ calculated in accordance with Section 2.3.1
$\text{DepLegRAB}(\text{SuppAs})_t$	means Depreciation on Legacy Retail Sale/Supply Regulated Asset Base commencing Regulatory Year ‘t’ calculated in accordance with Section 2.5
$\text{CRP}(\text{NewSuppAs})_t$	means Capital Recovery Payments in respect of New Assets made by Electricity Distribution Utility (Retail Sale/Supply) commencing Regulatory Year ‘t’ calculated in accordance with Section 2.9
$\text{CWCA}(\text{Supp})_t$	means Cost of Working Capital Allowance in respect of Retail Sale/Supply Assets commencing Regulatory Year ‘t’ calculated in accordance with Section 2.8.1
$\text{CorpTax}(\text{Supp})_t$	means Corporate Taxes in respect of Supply operations commencing Regulatory Year ‘t’ calculated in accordance with Section 2.9
$\text{K1}(\text{Supp})_t$	means Correction Factor in respect of Supply operations calculated in respect of Regulatory Year ‘t’ in accordance with Section 2.13.1

**2.2 Operating Expenses**

Operating expenses shall be determined for both Legacy Supply Assets (LegSuppAs) and New Supply Assets (NewSuppAs) for the first regulatory year and subsequent regulatory years in a Regulatory Control Period. The Commission shall disaggregate human resource expenses, operation and maintenance, customer services, and administration and general expenses, and ringfence human resource expenses as standalone expenses.

### 2.2.1 Legacy Supply Assets - First Regulatory Year

Operating Expenses such as human resource expense, operation and maintenance expense customer services expense, administration and general expense relating to Legacy Supply Assets shall be determined with respect to First Regulatory Year and Subsequent Regulatory Year in Regulatory Control Period as follows.

#### 2.2.1.1 Human Resource Expense

For determination of human resource expense for the first regulatory year in a Regulatory Control Period, the Commission shall ring-fence those expenses in consultation with the Electricity Distribution Utility (Retail Sale/Supply). Where human resource expense is projected, the projections shall be supported by relevant documentation.

#### 2.2.1.2 Other Operating Expense

For determination of Other Operating Expense categorised into operation and maintenance expense, customer services expense, administration and general expense of an Electricity Distribution Utility (Retail Sale/Supply) for the first regulatory year in a Regulatory Control Period, the following methodology shall be applied.

$$\text{OpEx}_t = \text{PAESAV} * \gamma$$

Where:

OpEx <sub>t</sub>	means First Regulatory Year Operating Expenses defined as Test Year of the Regulatory Control Period
PAESAV	means PURC Approved Test Year Electricity Supply Asset Value
γ	means PURC Approved Operating Expense Efficiency Benchmark Percentage

### 2.2.2 Legacy Supply Assets - Subsequent Regulatory Years

Operating expenses relating to Legacy Supply Assets Investments shall be determined with respect to subsequent regulatory years in a Regulatory Control Period as follows.

#### 2.2.2.1 Human Resource Expense

For subsequent regulatory years in a Regulatory Control Period, the Commission shall approve human resource expense in consultation with the Utility taking into consideration all relevant documentation approved by the Board of the Utility.

#### 2.2.2.2 Other Operating Expense

For subsequent regulatory years, the Commission shall determine other operating expenses using the following formula.

$$\text{OpEx}(\text{LegSuppAs})_{t+1} = \text{OpEx}(\text{LegSuppAs})_t + (\text{VNCLegSuppAs} * \mu)$$

Where:

OpEx(LegSuppAs) <sub>t+1</sub>	means Forecast Operating Expenses of Electricity Distribution Utility in respect of Legacy Supply Assets
OpEx(LegSuppAs) <sub>t</sub>	means Base Year Operating Expenses of Electricity Distribution Utility in respect of Legacy Supply Assets
VNCLegSuppAs	means Value of Newly Commissioned Legacy Supply Assets
μ	means Percentage of Value of Newly Commissioned Legacy Supply Assets Dedicated to Operating Expenses as Approved by the Commission

**2.2.3 New Retail Sale/Supply Assets - First Regulatory Year**

Operating Expenses such as human resource expense, operation and maintenance expense customer services expense, administration and general expense relating to Newly Commissioned Retail Sale/Supply Assets shall be determined with respect to the first regulatory year and subsequent regulatory years in a Regulatory Control Period as follows.

**2.2.3.1 Human Resource Expense**

PURC shall assess and approve human resource expense dedicated to operating Newly Commissioned Retail Sale/Supply Assets for the first regulatory year in a Regulatory Control Period in consultation with the Electricity Distribution Utility (Retail Sale/Supply) taking into consideration all relevant documentation approved by the Board of the Electricity Distribution Utility (Retail Sale/Supply).

**2.2.3.2 Other Operating Expense**

Other Operating Expense as categorised (excluding human resource expense) for the first regulatory year in a Regulatory Control Period in respect of New Retail Sale/Supply Assets undertaken by the Utility, shall be determined by PURC using the following formula.

$$\text{OpEx(NewSuppAs)}_t = \text{VNCSuppAs} * \mu$$

Where:

- OpEx(NewSuppAs)<sub>t</sub> means Base Year Operation and Maintenance Expenses in respect of New Retail Sale/Supply Investments undertaken by Electricity Distribution Utility
- VNCSuppAs means Value of Newly Commissioned Retail Sale/Supply Assets undertaken by Electricity Distribution Utility
- μ means Percentage of Value of Newly Commissioned Retail Sale/Supply Assets dedicated to Operating Expenses as approved by the Commission

**2.2.4 New Retail Sale/Supply Assets - Subsequent Regulatory Year in Regulatory Control Period**

**2.2.4.1 Human Resource Expense**

The Commission shall approve any human resource expense dedicated to operating newly commissioned Retail Sale/Supply Assets for subsequent regulatory years in consultation with the Utility taking into consideration all relevant documentation approved by the Board of the Utility.

**2.2.4.2 Other Operating Expense**

For subsequent regulatory years in a Regulatory Control Period, PURC shall determine other operating expenses of a Utility using the following formula.

$$\text{OpEx(NewSuppAs)}_{t+1} = \text{OpEx(NewSuppAs)}_t + (\text{VNCNewSuppAs} * \mu)$$

Where:

- OpEx(NewSuppAs)<sub>t+1</sub> means Forecast Operation and Maintenance Expenses in respect of New Retail Sale/Supply Assets of Electricity Distribution Utility
- OpEx(NewSuppAs)<sub>t</sub> means Base Year Operation and Maintenance Expenses in respect of New Retail Sale/Supply Assets of Electricity Distribution Utility
- VNCNewSuppAs means Value of Newly Commissioned Retail Sale/Supply Assets
- μ means Percentage of Value of Newly Commissioned Retail Sale/Supply Assets Dedicated to Operating Expenses as Approved by the Commission

### 2.3 Return on Retail Sale/Supply Regulatory Asset Base

#### 2.3.1 Legacy Retail Sale/Supply Regulatory Asset Base

The Return on Legacy Retail Sale/Supply Regulatory Asset Base, commencing Regulatory Year (Regulatory Year ‘t’) shall be calculated as follows:

$$RnRAB(\text{LegSuppAs})_t = \text{MidYearRAB}(\text{LegSuppAs})_t * \text{WACC}$$

Where:

$RnRAB(\text{LegSuppAs})_t$  means the Return on Legacy Retail Sale/Supply Regulated Asset Base for Regulatory Year ‘t’

$\text{MidYearRAB}(\text{LegSuppAs})_t$  means the Mid-Year Legacy Retail Sale/Supply Regulated Asset Base for Regulatory Year ‘t’ calculated pursuant to Section 2.6.3

WACC means the Weighted Average Cost of Capital calculated pursuant to Section 1.5

#### 2.3.2 New Retail Sale/Supply Assets

The Return on New Retail Sale/Supply Assets commencing Regulatory Year ‘t’ shall be calculated as follows:

$$Rn(\text{NewSuppAs})_t = \text{MidYear}(\text{NewSuppAs})_t * \text{WACC}$$

Where:

$Rn(\text{NewSuppAs})_t$  means Return on New Retail Sale/Supply Assets for Regulatory Year ‘t’;

$\text{MidYear}(\text{NewSuppAs})_t$  means the Mid-Year New Retail Sale/Supply for Regulatory Year ‘t’ calculated pursuant to Section 2.6.3

WACC means the Weighted Average Cost of Capital for Regulatory Year ‘t’ pursuant to Section 1.5

### 2.4 Gearing and Allowable Rate of Return on Regulatory Asset Base

The PURC shall apply its established Gearing and also determine the allowable Rate of Return on Legacy Retail Sale/Supply Regulatory Asset Base as well as New Supply Assets as per Sections 1.4 and 1.5.

### 2.5 Depreciation on Retail Sale/Supply Regulatory Asset Base

The PURC shall calculate depreciation in respect of both Legacy Retail Sale/Supply Regulatory Asset Base and Newly Commissioned Retail Sale/Supply Assets, using the straight-line method of depreciation. The depreciation on above assets in respect of a Regulatory Year ‘t’ shall equal depreciation, which the Utility (Retail Sale/Supply) will recognise and approved by PURC during Regulatory Year ‘t’ with respect to the Opening Legacy Retail Sale/Supply Assets as well as Newly Commissioned Retail Sale/Supply Assets.

### 2.6 Regulatory Asset Base

The Regulatory Asset Base which comprises Legacy Retail Sale/Supply Regulatory Asset Base and Newly Commissioned Retail Sale/Supply Assets of the Utility shall at any particular point in time be revalued at its replacement price.

**2.6.1 Initial Opening Regulatory Asset Base - First Regulatory Year**

The Initial Opening Regulatory Asset Base, commencing Regulatory Year ‘1’ of the First Regulatory Control Period, shall be the Legacy Retail Sale/Supply Regulatory Asset Base and Newly Commissioned Retail Sale/Supply Assets by the Utility (where applicable) determined by PURC as follows.

$$\text{OpeningRAB(Supp)}_t = \text{OpeningRAB(Supp)}_{t-1} + \text{ActCapEx(Supp)}_{t-1} - \text{ActDep(Supp)}_{t-1} - \text{ActDisp(Supp)}_{t-1}$$

Where:

- Opening RAB(Supp)<sub>t</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t’
- Opening RAB(Supp)<sub>t-1</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t-1’
- ActCapEx(Supp)<sub>t-1</sub> means the actual Capital Expenses for Regulatory Year ‘t-1’, subject to a prudence test by PURC if actual Capital Expenses exceeds the approved Capital Expenses for such Regulatory Year, calculated in accordance with Section 2.7
- ActDep(Supp)<sub>t-1</sub> means the actual Depreciation for Regulatory Year ‘t-1’, calculated in accordance with Section 2.5
- ActDisp(Supp)<sub>t-1</sub> means the actual Disposition Proceeds for Regulatory Year ‘t-1’, calculated in accordance with Section 2.8
- RegulatoryDays<sub>t</sub> means the numbers of days from start of the opening RAB to the end of the Calendar Year (i.e. December 31) in Regulatory Year ‘t’.

**2.6.2 Opening Regulatory Asset Base Subsequent Regulatory Year**

The Utility shall provide detailed information for calculation and filing of Legacy Retail Sale/Supply Regulatory Asset Base and Newly Commissioned Retail Sale/Supply Assets by the Utility (where applicable) for the subsequent regulatory years for determination and approval by PURC.

The roll-forward for the Regulatory Asset Base shall be subject to a prudence test by PURC. The following formula shall be used to roll-forward the Regulatory Asset Base from the opening value for the first year of the previous Regulatory Period.

$$\text{OpeningRAB(Supp)}_{t+1} = \text{OpeningRAB(Supp)}_t + \text{CapEx(Supp)}_t - \text{Dep(Supp)}_t - \text{Disp(Supp)}_t$$

Where:

- OpeningRAB(Supp)<sub>t+1</sub> means the Opening Regulated Asset Base for Regulatory Year ‘t+1’
- OpeningRAB(Supp)<sub>t</sub> means the Opening Regulated Asset Base for First Regulatory Year ‘t’
- CapEx(Supp)<sub>t</sub> means the approved Capital Expenses for First Regulatory Year ‘t’, calculated in accordance with Section 2.7
- Dep(Supp)<sub>t</sub> means the Depreciation for First Regulatory Year ‘t’, calculated in accordance with Section 2.5
- Disp(Supp)<sub>t</sub> means the Disposition Proceeds for First Regulatory Year ‘t’, calculated in accordance with Section 2.8

**2.6.3 Mid-Year Regulated Asset Base**

The Mid-Year Regulated Asset Base as of the mid-point of each Regulatory Year shall be calculated as follows:

$$\text{MidYearRAB(Supp)}_t = \text{OpeningRAB(Supp)}_t + 0.5(\text{CapEx(Supp)}_t - \text{Dep(Supp)}_t - \text{Disp(Supp)}_t)$$

Where:

- $\text{MidYearRAB(Supp)}_t$  means the Mid-Year Regulated Asset Base for Regulatory Year ‘t’
- $\text{OpeningRAB(Supp)}_t$  means the Opening Regulated Asset Base for Regulatory Year ‘t’
- $\text{CapEx(Supp)}_t$  means the Capital Expenses for Regulatory Year ‘t’, calculated in accordance with Section 2.7
- $\text{Dep(Supp)}_t$  means the Depreciation for Regulatory Year ‘t’, calculated in accordance with Section 2.5
- $\text{Disp(Supp)}_t$  means the Disposition Proceeds for Regulatory Year ‘t’, calculated in accordance with Section 2.8

### **2.7 Capital Expenses**

Capital Expenses for each Regulatory Year occurring during the first and subsequent regulatory years in a Regulatory Control Period shall equal the amount approved by PURC pursuant to the relevant Major Tariff Review Decision. Capital Expenses in respect of a project shall be recognized at the time of commissioning and shall include capitalised interest.

### **2.8 Disposition Proceeds**

Disposition Proceeds for each Regulatory Year (Regulatory Year ‘t’) shall equal the proceeds realized by the Utility from the sale of any assets that are no longer useful in connection with the provisions of Retail Sale/Supply Service determined as of the relevant Major Tariff Review determination date.

### **2.9 Capital Recovery Payments on New Retail Sale/Supply Assets**

Capital Recovery Payments in respect of New Retail Sale/Supply Assets made by the Utility commencing Regulatory Year ‘t’ shall be the sum of Return and Depreciation on Newly Commissioned Retail Sale/Supply Assets calculated in accordance with Section 2.3.2 and Section 2.5.

### **2.10 Working Capital Allowance**

The Working Capital Allowance commencing Regulatory Year (Regulatory Year ‘t’) shall be calculated as follows:

$$\text{WCA(SuppAs)}_t = \frac{\text{Lag(Days)}_t - \text{Lead(Days)}_t + \text{Inventory (Days)}}{365} * \text{OpEx(SuppAs)}_t$$

Where:

- $\text{WCA(SuppAs)}_t$  means Working Capital Allowance in respect of Retail Sale/Supply Assets calculated for Regulatory Year ‘t’
- Lag Days means Average Debtor days calculated for Regulatory Year ‘t’
- Lead Days means Average Creditor Days Calculated for regulatory Year ‘t’
- $\text{OpEx(SuppAs)}_t$  means Sum of Operating Expenses in respect of Retail Sale/Supply Assets calculated for Regulatory Year ‘t’

### **2.11 Cost of Working Capital Allowance**

The Cost of Working Capital Allowance Retail Sale/Supply Assets commencing Regulatory Year (Regulatory Year ‘t’) shall be calculated as follows:

$$CWCA(\text{SuppAs})_t = WCA(\text{SuppAs})_t * WACC$$

Where:

- $CWCA(\text{SuppAs})_t$  means Cost of Working Capital Allowance in respect of Retail Sale/Supply Assets calculated for Regulatory Year ‘t’
- $WCA(\text{SuppAs})_t$  means Working Capital Allowance in respect of Retail Sale/Supply Assets calculated for Regulatory Year ‘t’
- WACC means Weighted Average Cost of Capital calculated pursuant to Section 1.5

The following assumptions shall be considered in the determination of the allowance for working capital funding.

1. Tariff revenue debtors for prepaid meters at zero (0) days
2. Tariff revenue debtors for credit meters at 45 days for residential and non - residential
3. Tariff revenue debtors for credit meters at 30 days for SLT customers
4. Tariff revenue debtors for MDAs paying their bills directly outside government
5. Tariff revenue debtors for Government, MoF and MDAs paid directly by Government at about 90 to 120 days.
6. Operating cost creditors at averaging 30 days of annual non capital expenditure

PURC shall ensure that the Utility observes optimal working capital allowance management practices in accordance with international standards.

Prior to or upon commencement of the Regulatory Control Period, a lead – lag study shall be undertaken to form the basis for the determination of the regulatory working capital allowance.

### **2.12 Corporate Tax**

Corporate Tax on the Retail Sale/Supply licence business shall be in accordance with the provisions of applicable Ghana Revenue Tax Laws. The Corporate tax shall be treated as an expense hence incorporated into Annual Revenue Requirement and recovered from consumers through tariffs. The corporate tax shall be computed using the following formula.

$$\text{CorpTax}_t = (\text{Pre-Tax WACC} - \text{Post-Tax WACC}) * \text{RAB}_{\text{EDU}}$$

Where:

- $\text{CorpTax}_t$  means Corporate Tax
- Pre-Tax WACC means Weighted Average Cost of Capital Including Corporate Tax Percentage
- Post-Tax WACC means Weighted Average Cost of Capital Excluding Corporate Tax Percentage
- $\text{RAB}_{\text{EDU}}$  means PURC Approved Test Year Regulatory Asset Base of Electricity Distribution Utility (Retail Sale/Supply)

### **2.13 Correction of Electricity Retail Sale/Supply Revenue**

The correction factor shall be a monetary value whereby maximum allowed revenue for Regulatory Year ‘t’ is decreased or increased by the difference between Approved Annual Revenue Requirement (Retail Sale/Supply) and the efficient and prudent revenue requirement (actual) for the relevant regulatory years calculated in accordance with the methodology below.

PURC shall correct for over-recovery or under-recovery of electricity supply revenue using correction factor established on the basis of actual electricity supplied and actual billing data (billed energy and number of customers) assuming PURC Target Aggregate Technical, Commercial and Collection Losses as established in

Sections 2.17 and 2.18. Correction Factors shall be calculated using Annual and Quarterly Reports as well as other relevant data submitted to PURC by Electricity Distribution Utility (Retail Sale/Supply).

**2.13.1 Correction Factor**

The Correction Factor in respect of Regulatory Year ‘t’ shall equal zero (0) for the purposes of estimating the Annual Revenue Requirement (Retail Sale/Supply) for Regulatory Year ‘1’ and Regulatory Year ‘2’ of Regulatory Control Period and shall be calculated as follows:

$$K_2(\text{Supp})_t = \left[ \left( \text{AdjARR}(\text{Supp})_{t-2} - \text{ActualTR}(\text{Supp})_{t-2} \right) \right] * \left[ (1 + \text{WACC})^2 \right]$$

Where:

$K_2(\text{Supp})_t$  means the Correction Factor (Second) calculated for Regulatory Year ‘t’

$\text{Actual ARR}(\text{Supp})_{t-2}$  means the Adjusted Annual Revenue Requirement (Supply) for Regulatory Year ‘t-2’ as per actual market conditions

$\text{ActualTR}(\text{Supp})_{t-2}$  means the revenues Electricity Distribution Utility (Retail Sale/Supply) would have earned and collected during Regulatory Year ‘t-2’ by charging Supply Service Rates, calculated assuming that Electricity Distribution Utility (Retail Sale/Supply) achieved the Target Aggregate Technical and Commercial Loss Ratio and Target Collection Loss Ratio that were applicable to Regulatory Year ‘t-2’ given the actual energy metered at the bulk supply points

WACC means the Weighted Average Cost of Capital calculated pursuant to Section 1.5

**2.14 Generation Purchase Cost**

The Generation Purchase Cost shall be treated as a pass-through. For purposes of determining Revenue Requirement of an Electricity Distribution Utility or an Electricity Retail Sale Licensee, Generation Purchase Costs (Capacity and Energy) shall equal Bulk Generation Costs (Capacity and Energy) as per Rate Setting Guidelines for Competitive Procurement of Electricity Generation Capacity and Energy in the Regulated Electricity Market.

Consequently, the Generation Purchase Charge (PPCh) (Capacity and Energy) shall be equal to the Bulk Generation Charge (Capacity and Energy) at which electricity distribution companies (DISCOs), shall procure electricity from generation sources in respect of their operations in the regulated market.

**2.15 Allocation Procurement Remittance and Total Revenue Requirement of the Electricity Supply Value Chain**

The Total Revenue Requirement determined in Section 2.15 shall be allocated fully to Rate Payers or End-use Customers on the basis of customer class rates. However, where National Annual Budgetary/Financial Support to the Electricity Value Chain may be provided to all or specific customer group(s), such financial support on the Total Revenue Requirement shall be to reduce Power Purchase Costs of the final Total Revenue Requirement to be allocated to End-Use Customers deriving an Allowed Power Procurement Remittance. Therefore, the allocatable Total Revenue Requirement shall be determined using the following formula.

$$\text{TRR}_t = (\text{GPC}_t - \Phi) + \text{TSC}_t + \text{DSC}_t$$

Where:

$\text{TRR}_t$  Is Total Revenue Requirement for Regulatory Year ‘t’

GPC <sub>t</sub>	Is Projected Generation Purchase Cost Tariff for Regulatory Year ‘t’
Φ <sub>t</sub>	Is National Annual Budgetary/Financial Support to the Electricity Value Chain for Regulatory Year ‘t’
GPC-Φ <sub>t</sub>	Is Allowed Procurement Remittance (APR <sub>t</sub> )
TSC <sub>t</sub>	Is Projected Transmission Service Cost for Regulatory Year ‘t’
DSC <sub>t</sub>	Is Projected Distribution Service Cost for Regulatory Year ‘t’

### 2.16 Approval of Revenue Requirement

The Commission is not obliged to approve the amount for each cost element or sub-element of the revenue requirement proposed by the Utility. The Commission may allow or disallow the proposed revenue requirement based on a thorough evaluation of the proposed amount. The revenue requirement shall be allowed if it is found to be reasonable, prudent, and necessary to provide safe, reliable, and affordable service to customers. The revenue requirement may be reduced or portions disallowed based on the impact on the Utilities, customers and the economy while ensuring financial sustainability of the Utilities.

### 2.17 Target Aggregate Technical and Commercial Loss Ratio

The Target Aggregate Technical and Commercial Loss Ratio agreed with the Utility in respect of each Regulatory Year ‘t’ during a Regulatory Control period shall equal:

- (a) in respect of Regulatory Year 1, provisional baseline aggregate technical and commercial loss ratio established by PURC based on actual data from the twelve months preceding the effective implementation date of the approved tariff
- (b) in respect of Regulatory Year 2, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 2]**
- (c) in respect of Regulatory Year 3, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 3]**
- (d) in respect of Regulatory Year 4, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 4]**
- (e) in respect of Regulatory Year 5, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 5]**

provided, that, in the event that any failure to complete and commission investments approved by PURC and the Energy Commission in the Distribution System, PURC will adjust the above Target Aggregate Technical and Commercial Loss Ratio on a fair and equitable basis.

After the Initial Regulatory Control Period, the Target Aggregate Technical and Commercial Loss Ratio shall equal the percentage established by PURC in the relevant Major Tariff Review Decision.

### 2.18 Target Collection Loss Ratio

The Target Collection Loss Ratio in respect of each Regulatory Year ‘t’ during the Initial Regulatory Control period shall equal

- (a) in respect of Regulatory Year 1, provisional baseline collection loss ratio established by PURC based on data preceding the effective implementation date of the approved tariff

- (b) in respect of Regulatory Year 2, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 2]**
- (c) in respect of Regulatory Year 3, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 3]**
- (d) in respect of Regulatory Year 4, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 4]**
- (e) in respect of Regulatory Year 5, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 5]**

provided, that, in the event that any failure to complete and commission PURC and EC Approved Investment in the Distribution System, PURC will adjust the above Target Collection Loss Ratio on a fair and equitable basis.

After the Initial Regulatory Control Period, the Target Collection Loss Ratio for each Regulatory Year ‘t’ shall be determined by PURC for the subsequent Regulatory Control Periods as per Section 2.21:

**2.19 Calculation of Collection Loss Ratio**

The Collection Loss Ratio of Retail Sale Licensee shall be calculated as of the beginning of each Regulatory Year (Regulatory Year ‘t’) in accordance with the following formula:

$$CLR_t = \frac{TAI_t - TAC_t}{TAI_t}$$

Where:

- CLR<sub>t</sub> (Collection Loss Ratio) means the Collection Loss Ratio for Regulatory Year ‘t’
- TAI<sub>t</sub> (Total Amount Invoiced) means the total amount invoiced by Electricity Distribution Utility (Supply) in respect of Distribution Service and/or Retail Service provided during Regulatory Year ‘t’
- TAC<sub>t</sub> (Total Amount Collected) means the total amount collected by Electricity Distribution Utility (Supply) in respect of Distribution Service and/or Retail Service provided during Regulatory Year ‘t’

**2.20 Total Cost and Average Cost to End-Use Customers**

Where a Utility is engaged in the supply or sale of electricity to Retail Customers, the total cost to such Retail Customers shall be determined as follows:

$$TC_t = \frac{TRR_t + RevDeReg_t}{(1 - TCLR_t)}$$

Where:

- TC<sub>EUT</sub> means Total Cost to Retail Customers in respect of Regulatory Year ‘t’

TTR <sub>t</sub>	means Total Revenue Requirement in respect of Regulatory Year ‘t’ pursuant to Section 2.15
RevDeReg <sub>t</sub>	means Revenue from Wheeling Charges on account of sales to deregulated customers in respect of Regulatory Year ‘t’
TCLR <sub>t</sub>	means the Target Collection Loss Ratio in respect of Regulatory Year ‘t’

The Commission shall determine average cost to End-Use Customers using the following formula.

$$\text{AvgEUT}_t = \frac{\text{TC}_t}{\text{Net Sales}_t}$$

AvgEUT <sub>t</sub>	means Average End User Costs to Retail Customers in respect of Regulatory Year ‘t’
Net Sales <sub>t</sub>	means Total Sales to regulated customers based on Target Technical and Commercial Losses pursuant to Section 2.17

### **2.21 Quarterly Review of End User Tariffs**

End User Tariffs determined as per methodology in Section 2.20 and approved by PURC will be reviewed quarterly in line with PURC’s Guidelines for Quarterly Adjustment of Natural Gas, Electricity and Water Tariffs. The objective of quarterly reviews is to ensure real value of PURC approved End User Tariffs are maintained at any particular period of time.

## PART 3 COST ALLOCATION AND TARIFF DESIGN

### 3.1 Functionalisation, Classification and Allocation of Total Cost of Electricity Supply

To enhance transparency in translation of total cost of electricity supply into rates payable by End-Use Customers, PURC shall adopt the methodology of cost functionalisation, classification and allocation.

#### 3.1.1 Functionalisation of Total Cost of Electricity Supply

To establish total cost of electricity supply by function, PURC shall disaggregate approved Total Revenue Requirement for the electricity value chain by the following cost functional areas:

1. Generation Costs
2. Transmission Costs
3. Distribution Costs
4. Customer Service Costs

#### 3.1.2 Classification of Total Cost of Electricity Supply

Following cost functionalization of total cost of electricity supply, the costs shall be categorised as follows.

1. Demand-Related or Capacity-Related Costs
2. Energy-Related Costs
3. Customer-Related Costs

#### 3.1.3 Allocation of Total Cost of Electricity Supply

The functionalised and classified costs shall be allocated among defined customer categories based on demand, energy and customer related costs using allocation factors consistent with cost causation as specified in the following sections.

##### 3.1.3.1 Demand-Related Cost Allocation Factor

Demand-related cost allocation factor derived based on customer category contribution to system peak (coincidental peak demand) as follows:

$$DCAF_n = \frac{CPD_n}{SPD}$$

Where:

DCAF <sub>n</sub>	Is Demand-Related Cost Allocation Factor for Customer Category (n)
CPD <sub>n</sub>	Is Coincidental Demand per Customer Category (MW)
SPD	Is System Peak Demand which is sum of all Customer Category Coincidental Peak Demand (MW)

##### 3.1.3.2 Energy-Related Cost Allocation Factor

Energy-related cost allocation factor derived based on kWh of Energy Sold (both at customer meter and at generation) as follows:

$$ECAF_n = \frac{TE_n}{SES}$$

Where:

ECAF	Is Energy-Related Cost Allocation Factor for Customer Category (n)
TE <sub>n</sub>	Is Total Energy Sold per Customer Category (kWh)
SES	Is Sum of All Customer Category Energy Sold (kWh)

### 3.1.3.3 Customer-Related Cost Allocation Factor

Customer-related cost allocation factor derived as number of customers per customer category against total number of customers determined as follows:

$$CCAF_n = \frac{CUS_n}{TC}$$

Where:

CCAF	Is Customer-Related Cost Allocation Factor for Customer Category (n)
CUS <sub>n</sub>	Is Number of Customers per Customer Category
TC	Is Total Number of Customers

### 3.1.4 Allocation of Total Cost of Electricity Supply to Final End-Use Consumers

PURC shall determine the cost of serving each Customer Category using the derived demand-related, energy-related and customer-related allocation factors as follows:

$$CoS_n = (DCAF_n * TDRR) + (ECAF_n * TERR) + (CCAF_n * TCRR)$$

Where:

CoS <sub>n</sub>	Is Cost of Service for Respective Customer Category
DCAF <sub>n</sub>	Is Demand-Related Cost Allocation Factor for Respective Customer Category
TDRR	Is Total Demand-Related Revenue Requirement
ECAF <sub>n</sub>	Is Energy-Related Cost Allocation Factor for Respective Customer Category
TERR	Is Total Energy-Related Revenue Requirement
CCAF <sub>n</sub>	Is Customer-Related Cost Allocation Factor for Respective Customer Category
TCRR	Is Total Customer-Related Revenue Requirement

### 3.2 Distribution Service Charges

PURC shall issue distribution charges to be covered by Generators and off-takers trading across the distribution network. These charges include:

- DSC-1: distribution service charge that remunerates allowed costs of the distribution network (wheeling charge). It is computed as follows:
  - $DSC-1 = \text{Total Distribution Revenue Requirement (GHp)} / \text{Total Net Energy Consumption at the Distribution Network (kWh)}$ .
- DSC-2: distribution losses charge that remunerates energy losses along the distribution network (losses charge). It is computed as follows:
  - $DSC-2 = \text{Total Distribution Losses Cost (GHp)} / \text{Total Net Energy Consumption at the Distribution Network (kWh)}$ .
  - Total Distribution Losses Cost (GHp) is computed as the product of total Energy Purchase Cost (GHp) and Distribution Energy Losses ratio (%).

**APPENDIX - Principles for Accounting for Depreciation**

The Depreciation on Regulated Asset Base shall be calculated using the straight-line method of depreciation/amortisation and the following useful asset life and depreciation rates.

Category	Description	Useful Life	Depreciation Rate
Sub-Transmission	Land	0	
Sub-Transmission	Structures	40	2.50
Sub-Transmission	33/11kV Underground Cables	40	2.50
Sub-Transmission	33/11kV Transformers	40	2.50
Sub-Transmission	33/11kV Overhead Lines/Wood Poles	20	5.00
Sub-Transmission	33/11kV Overhead Lines/Steel Tower	40	2.50
Sub-Transmission	Electrical Equipment	25	4.00
Distribution	Land	0	
Distribution	Structures	40	2.50
Distribution	11kV Underground Cables	40	2.50
Distribution	LV Underground Cables	30	3.33
Distribution	33kV/LV Transformers	30	3.33
Distribution	11kV/LV Transformers	30	3.33
Distribution	11kV Overhead Lines/Wood Poles	20	5.00
Distribution	11kV Overhead Lines/Steel Towers	35	2.86
Distribution	LV Overhead Lines	25	4.00
Distribution	LV Serv Connections/UGC	30	3.33
Distribution	LV Serv Connections/OHL	25	4.00
Distribution	Electrical Equipment	25	4.00
Buildings	Land	0	
Buildings	Structures	40	2.50
General Tools	Workshop Tools	8	12.50
General Tools	Instruments & Test Equipment	8	12.50
Fixtures/Fittings	Fixtures & Equipment	8	12.50
Fixtures/Fittings	Office Machines	8	12.50
Fixtures/Fittings	Computers and Accessories	4	25.00
Fixtures/Fittings	Computers & Access/Mframe, Server	5	20.00
Meters	Credit Meters	20	5.00
Meters	Prepayment Meters	10	10.00
Transport	Light Vehicles	4	25.00
Transport	Heavy Duty Vehicles	5	20.00
Transport	Specialised Vehicles	10	10.00
Computer Software	Persopay and HR	3	33.33
Computer Software	SunSystems	3	33.33
Computer Software	Local Area Network	3	33.33